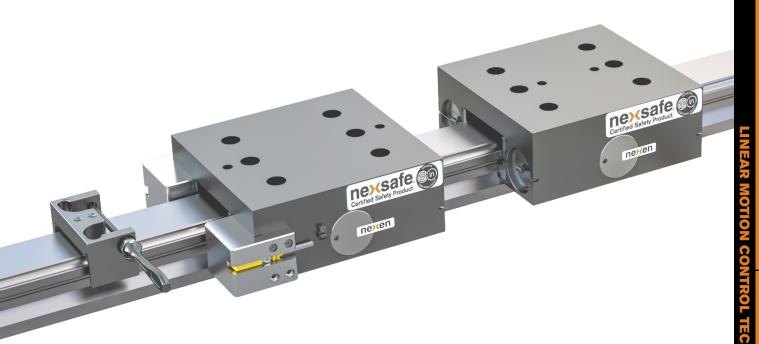




LINEAR MOTION CONTROL

Technical Data Sheet



Linear Profile Guide Rail Brakes:

- RBB: NexSafe[™] Safety Rated Rail Brake, Spring Engaged, Air Released
- RBM: Manual Rail Brake, Manually Engaged and Released





A New Standard In Performance

Nexen's RBB Series of linear profile guide rail brakes use spring force to secure the load in holding applications. Superior response time and high force for stopping and holding in e-stop and power-off situations. Each RBB brake clamps directly onto the guide rail to provide positive braking and holding in all axes, with no effect on bearing surfaces.



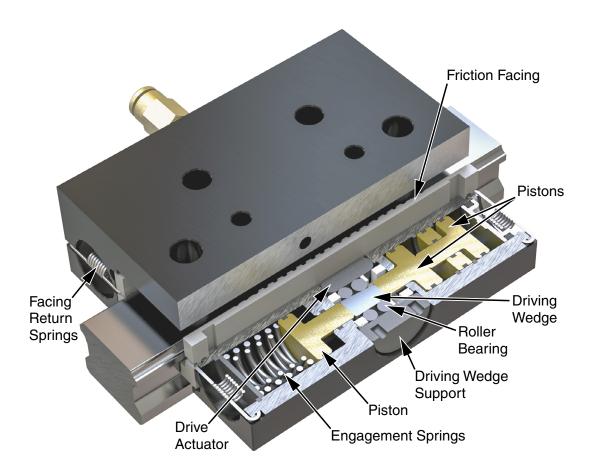
nexsafe.



Nexen's Spring Engaged, Air Released Rail Brakes are safety rated to comply with international safety standard ISO 13849-1. Category Level up to <u>4</u> and Performance Level up to <u>e</u>, able to be achieved using Nexsafe™ products in recommended configuration.

- Large friction facing contact area for consistent performance and low rail wear
- Ideal for power-off, e-stop and holding applications
- Low backlash for accurate position holding
- Brake geometry is similar to linear bearing cassettes for easy installation
- Provides stiffness and eliminates vibration in linear drives
- Large clearance between brake and rail compensates for installation misalignment
- No lubrication or periodic maintenance required
- Models available to fit most common profile guide rails
- Highest spring engaged / air released holding force on the market

RBB Rail Brake Specifications



Specifications

Model	Holding Force (F) (minimum)	Backlash at Full Brake Force (maximum)	Release Pressure (minimum)	Starting Engagement Time ² (t _e)	Mass ³ (average)	Ambient Temperature	Cycle Life (B10)
RB15B	500 N [112 lbs]	Up to 0.10 mm [0.004 in]	5.5 bar [80 psi]	0.049 sec.	0.41 Kg [0.904 lbs]		
RB20B	800 N [180 lbs]	Up to 0.13 mm [0.005 in]	5.5 bar [80 psi]	0.044 sec.	0.62 Kg [1.367 lbs]		
RB25B	1000 N [225 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.050 sec.	0.84 Kg [1.86 lbs]		2 Million
RB30B	1300 N [292 lbs]	Up to .020 mm [0.008 in]	5.5 bar [80 psi]	0.070 sec	1.54 Kg [3.40 lbs]	4.5 to 65.5°C [40 to 150°F]	Cycles
RB35B	1600 N [360 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.070 sec.	2.04 Kg [4.50 lbs]		
RB45B	2600 N [585 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.080 sec.	3.48 Kg [7.68 lbs]		
RBL55B ¹	2600 N [585 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.225 sec.	5.21 Kg [11.49 lbs]		1 Million
RBL65B ¹	3400 N [764 lbs]	Up to 0.20 mm [0.008 in]	5.5 bar [80 psi]	0.230 sec.	7.10 Kg [15.65 lbs]		Cycles

Contact Nexen if one or more of these specifications must be modified for your application.

3

¹ RBL55B & RBL65B are not currently safety rated, nor are they available with operating mode sensors.

 $^{^2}$ Average, full engagement time with up to 2 meters length of 4mm, polyurethane tube, and 1.4 C_v , 24 volt directional control valve and no quick exhaust.

³ Mass shown is for standard units. Units with operating mode sensors have up to .25kg in additional mass. (Mass includes all lengths of cabling.)

RBB Rail Brake Product Numbers by Rail Type

Rail/Carriage Manufacturer	Rail Type	RB15B	RB20B	RB25B	RB30B	RB35B	RB45B	RBL55B	RBL65B
ABBA	BRH	968217	968218	968112	968219	968220	968221	N/A	N/A
HIWIN	HGR ¹	968179²	968178	968161	968107	968174	968181	9682615	Call Us ³
	LWH	968132	968127	968158	968115	968171	968184	9682545	9682594,5
IKO	LRX	968134	968129	968160	968116	968173	968182	9682535	9682584,5
	LWE	968133	968128	968159	968117	968172	968183	N/A	N/A
INIA	KUSE	N/A	968148	968154	968118	968167	968194	N/A	N/A
INA	KUVE	968137	968143	968155	968108	968168	968195	N/A	N/A
LINTECH	HRC	968214	968215	968216	Call Us ³	Call Us ³	Call Us³	N/A	N/A
NB	SGL ¹	968223²	Call Us ³	N/A	N/A				
NOOK	NH	Call Us ³	Call Us ³	968213	Call Us ³	968198	Call Us ³	N/A	N/A
NOOK	NHRC / NARC	Call Us ³	Call Us ³	968233	Call Us ³	Call Us ³	Call Us ³	N/A	N/A
NOV	LS / NS	968138	968144	968156	968119	968169	N/A	N/A	N/A
NSK	LH / NH	968131	968125	968157	968120	968170	968185	9682555	9682604,5
PMI	MSA	968200	968201	968202	968203	968204	968205	Call Us ³	Call Us ³
ROCKFORD	RPG	968217	968218	968112	968219	968220	968221	N/A	N/A
ROLLON	MRRO	Call Us ³	Call Us ³	968235	Call Us ³	Call Us ³	N/A	N/A	N/A
SBC	SBG	Call Us ³	968188	Call Us ³					
SBC	SBI	Call Us ³	968186	Call Us ³					
SCHNEEBERGER	MR	N/A	N/A	968162	N/A	Call Us ³	968206	Call Us ³	Call Us ³
	LLRHSA	968139	968146	968152	968105	968165	Call Us ³	N/A	N/A
SKF	LLRHSLA	968139	968146	968153	968105	968165	Call Us ³	N/A	N/A
Orti	LLRHSSA	968139	968146	968153	968105	968165	Call Us ³	N/A	N/A
	LLTHR	Call Us ³	Call Us ³	968121	968111	Call Us ³	Call Us ³	N/A	N/A
	1605	968139	968146	968152	968105	968165	968187	Call Us ³	Call Us ³
CTAD	1607	968139	968146	968152	968105	968165	968187	Call Us ³	Call Us ³
STAR (BOSCH)	1645	968139	968146	968152	968105	968165	968187	Call Us ³	Call Us ³
(REXROTH)	1647	968139	968146	968152	968105	968165	968187	Call Us ³	Call Us ³
	1805	N/A	N/A	968153	Call Us ³	968166	968197	Call Us ³	Call Us ³
	1807	N/A	N/A	968153	Call Us ³	968166	968197	Call Us ³	Call Us ³
TBI	TRH	968207	968208	968209	968210	968211	Call Us ³	Call Us ³	Call Us ³
	HSR	968135 ²	968145	968130	968102	968101	968193	9682525	9682574,5
THK	SHS	9681412	968147	968150	968106	968163	968190	968250⁵	9682564,5
THI	SRG	968136	968142	968126	968114	968164	968192	9682515	Call Us ³
	SR ¹	9681772	968180	968151	968113	968176	N/A	N/A	N/A
THOMSON	400	Call Us ³	968149	Call Us ³	968122	Call Us ³	Call Us ³	Call Us ³	N/A
N/A	40mm Rectangle	Call Us ³	968199	Call Us ³	Call Us ³				

Contact Nexen if you don't see the rail listed above for your application, or need operating mode sensors for your application.

All Rail Brakes shown are Safety Rated and can be modified to add operating mode sensors, except sizes 55 & 65.

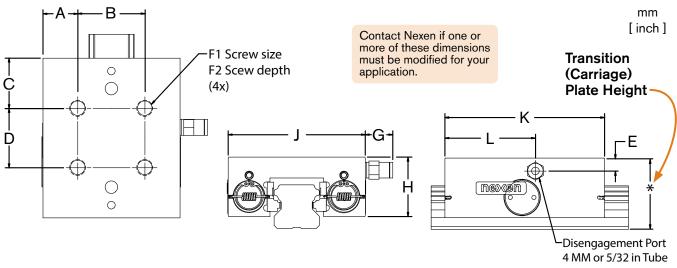
All Rail brakes shown above have a release pressure of 5.5 BAR [80 PSI], many rail types/sizes are available with release pressures below 4.1 BAR [60 PSI].

^[1] Rail brake holding forces are 10% less than shown on the previous page when used with THK: "SR", Hiwin: "HGR" and NB: "SGL" rail types.

 $^{^{[2]}} RB15 \ product \ numbers \ 968135, \ 968141, \ 968177, \ 968223 \ and \ 968179 \ have \ a \ holding \ force \ of \ 400 \ N \ [90 \ lbs].$

^[3] Contact Nexen for Availability. ⁴RBL65 Not Recommended for E-Stops. ⁵RBL55 and RBL65 are not (€ rated.

RBB Rail Brake Dimensions

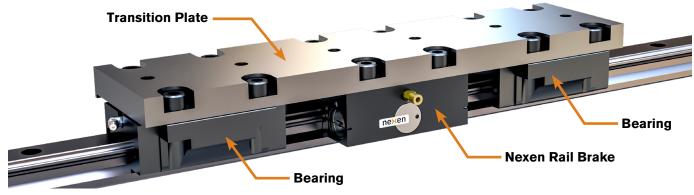


Model	A	В	С	D	E	F1	F2	G	Н	J	K	L	Threaded Port
RB15B	14.25 [0.561]	26.00 [1.024]	20.50 [0.807]	26.00 [1.024]	5.0 [.20]	M5 x 0.8-6H	5.20 [0.210]	13.90 [0.550]	21.00 [0.827]	54.50 [2.146]	67.00 [2.640]	41.00 [1.610]	M5 x 0.8-6H
RB20B	17.25 [0.679]	30.00 [1.181]	23.50 [0.930]	30.00 [1.181]	5.0 [.20]	M6 x 1.00-6H	7.20 [0.280]	13.90 [0.550]	25.50 [1.004]	64.50 [2.539]	77.00 [3.030]	45.00 [1.770]	M5 x 0.8-6H
RB25B	17.75 [0.699]	34.00 [1.339]	25.50 [1.000]	30.00 [1.181]	7.0 [.28]	M8 x 1.25-6H	9.00 [0.340]	13.90 [0.550]	30.00 [1.181]	69.50 [2.736]	80.90 [3.190]	45.90 [1.810]	M5 x 0.8-6H
RB30B	8.75 [0.344]	72.00 [2.835]	24.00 [0.940]	52.00 [2.047]	7.0 [.28]	M10 x 1.5-6H	9.00 [0.350]	13.90 [0.550]	35.00 [1.378]	89.50 [3.524]	100.00 [3.937]	48.00 [1.890]	M6 x 1.0-6H
RB35B	8.75 [0.344]	82.00 [3.228]	22.00 [0.870]	62.00 [2.441]	9.0 [.35]	M10 x 1.5-6H	9.00 [0.350]	13.90 [0.550]	40.00 [1.575]	99.50 [3.917]	106.00 [4.173]	52.20 [2.055]	M6 x 1.0-6H
RB45B	27.25 [1.073]	65.00 [2.559]	28.50 [1.120]	70.00 [2.756]	12.5 [.49]	M12 x 1.75-6H	14.00 [0.550]	13.90 [0.550]	50.00 [1.969]	119.50 [4.705]	127.00 [5.000]	63.20 [2.49]	M6 x 1.0-6H
RBL55B	27.5 [1.08]	75.00 [2.953]	26.0 [1.02]	75.00 [2.953]	12.5 [.49]	M12 x 1.75-6H	14.00 [0.550]	14.70 [0.579]	58.00 [2.283]	130.00 [5.118]	127.00 [5.000]	62.60 [2.465]	M6 x 1.0-6H
RBL65B	32.0 [1.26]	76.00 [2.992]	28.5 [1.12]	70.00 [2.756]	15.0 [.59]	M16 x 2.00-6H	20.00 [0.787]	14.70 [0.579]	75.00 [2.953]	140.00 [5.512]	127.00 [5.000]	75.00 [2.953]	M6 x 1.0-6H

^{*}Additional dimensions and tolerances are available in the drawings and CAD models on the product pages on Nexen's website. See Page 9 for optional operating mode sensor dimensions.

RBB Typical Mounting Arrangement

Note: Refer to Drawings and CAD models on www.nexengroup.com to determine if Nexen's Rail Brake and the application's Bearings have the same Transition (Carriage) Plate height. If not, the Transition (Carriage) Plate must have a stepped portion or adapters must be used.



RBB Rail Brake Sample Calculations for Emergency Stops

SAMPLE DATA

Brake	Brake Force	Brake Engagement	Acceleration of	Mass of Load	Load Velocity
Model ^{1, 2}	(F) ¹	Time (t _e) ¹	Gravity (g)	(m)	(V)
RB25B	1000 N	0.050 seconds	9.8 m/s²	45.4 kg	0.50 m/s

¹For brake specifications, see Specifications Table on page 4.

HORIZONTAL TRAVEL (X and Y axis)

Dynamic Stopping Time (in seconds):

$$t_T = \frac{m \cdot V}{F} + t_e$$

$$t_T = \frac{45.4 \cdot 0.50}{1000} + .050 = 0.073 \text{ seconds}$$

Dynamic Stopping Distance (in meters):

Distance of Travel During Brake Engagement (L₂)

$$L_{e} = V \cdot t_{e}$$
 $L_{o} = 0.5 \cdot 0.050 = 0.025 \text{ meters}$

Stopping Distance (L₂) at Full Brake Force

$$L_{s} = \frac{0.5 \cdot m \cdot V^{2}}{F}$$

$$L_{s} = \frac{0.5 \cdot 45.4 \cdot 0.50^{2}}{1000} = 0.006 \text{ meters}$$

Total Travel Distance

$$L_{_{\! T}} = L_{_{\! e}} + L_{_{\! s}}$$

 $L_{_{\! T}} = 0.025 + 0.006 = 0.031$ meters or 31 mm

In this example, the load will travel 31 mm [1.22 in] from the time the RB25B engages until the system is brought to a complete stop.

VERTICAL TRAVEL (DOWNWARD) (Z axis)

Dynamic Stopping Time (in seconds):

$$\begin{split} t_{\scriptscriptstyle T} &= \frac{m \bullet (g \bullet t_{\scriptscriptstyle e} + V)}{[F - (m \bullet g)]} + t_{\scriptscriptstyle e} \\ t_{\scriptscriptstyle T} &= \frac{45.4 \bullet (9.8 \bullet 0.050 + 0.50)}{[1000 - (45.4 \bullet 9.8)]} + 0.050 = 0.131 \text{ seconds} \end{split}$$

Dynamic Stopping Distance (in meters):

Distance of Travel During Brake Engagement (L₂)

$$L_{_{\rm e}} = 0.5 \cdot (t_{_{\rm e}}^{^{2}}) \cdot g + V \cdot t_{_{\rm e}}$$

 $L_{_{\rm e}} = 0.5 \cdot (.050^{2}) \cdot 9.8 + .5 \cdot .050 = 0.037$ meters

Stopping Distance (L_c) at Full Brake Force

$$\begin{aligned} & L_{s} = 0.5 \bullet [(t_{e} \bullet g) + V] \bullet (t_{T} t_{e}) \\ & L_{s} = 0.5 \bullet [(.050 \bullet 9.8) + 0.5] \bullet (0.131 - 0.050) \\ & L_{c} = 0.040 \text{ meters} \end{aligned}$$

Total Travel Distance

In this example, the load will travel 77 mm [3.03 in] from the time the RB25B engages until the system is brought to a complete stop.

²RBL65B not recommended for E-Stops.

Safety Rating

With third party certification carried out by Intertek®, Nexen's Rail Brakes are safety certified components capable of meeting the following ratings per safety standard ISO 13849-1:2015.

Cycle Life (B10D) of 4 million cycles

Common Cause Failure (CCF) is 75%

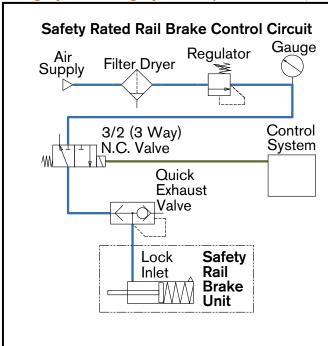
Mission Time is 10 Years

Mean Time to Dangerous Failure (MTTF_D) of 100 Years Assumes a B10D of 4 million cycles, H(op) of 16 hours/day, a D(op) of 260 days/year, maximum cycle rate of 37.4 seconds/cycle and maximum operation time of 10 years.

Diagnostic Coverage (DC) is dependent on brake redundancy and sensor setup:

	If DC is 0%	If DC is 60%	If DC is 90%	If DC is 99%
	No sensor feedback	Feedback sensor shall be used to monitor the	Feedback sensor shall be used to monitor the be cycled engaged and disengaged at least	ne operating mode of brake. The brake must st this often to check for brake functionality:
L	necessary.	operating mode of brake.	every 3 months	once every day

Category B or Category 1 Example: One Brake, No Sensors



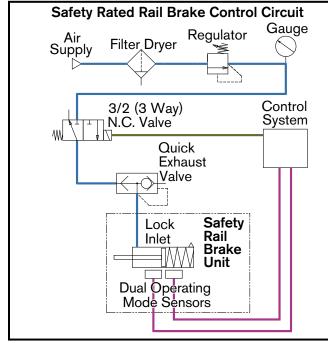
Category B						
Perfor	а	b				
	0	%				
MTTF _D	years	3.1	13			
Maximum average cycle rate	sec/cycle	1.2	4.9			
Maximum operation time	years	0.3	1.3			

Category 1

Perfor	b	С	
	0'	%	
MTTF _D	years	31	40
Maximum average cycle rate	sec/cycle	11.6	15.0
Maximum operation time	years	3.1	4

Air to Disengage Rail Brake
Control Wiring
Sensor Feedback Wiring

Category 2 Example: One Brake, Two Sensors



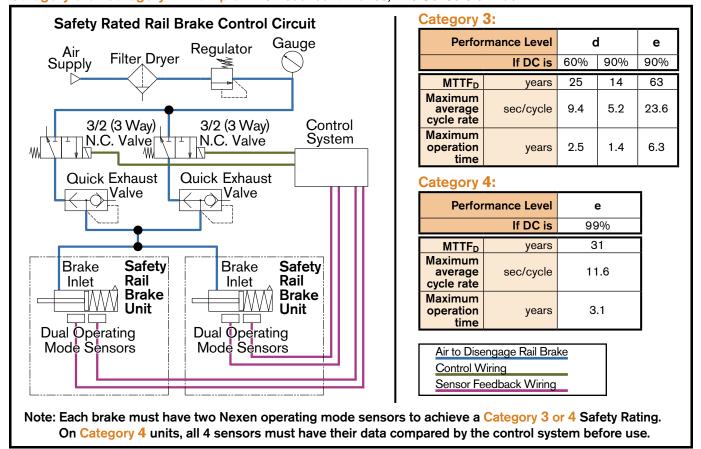
Category 2:

Perfor	С		d		
	If DC is	60%	90%	60%	90%
MTTF _D	years	23	17	63	37
Maximum average cycle rate	sec/cycle	8.6	6.4	23.6	13.9
Maximum operation time	years	2.3	1.7	6.3	3.7

Air to Disengage Rail Brake
Control Wiring
Sensor Feedback Wiring

Safety Rating

Category 3 or Category 4 Example: Two Redundant Brakes, Two Sensors on Each



Optional Operating Mode Sensors

SAFETY RATING COMPLIANCE

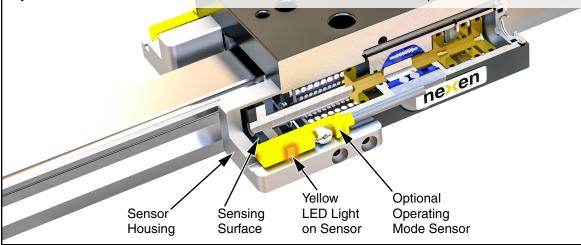
Nexen's Rail Brakes are Safety Rated by Intertek® and available with Operating Mode Sensors. By using the Operating Mode Sensor for either Engagement or Disengagement, system manufacturer's are able to gain higher safety category ratings per ISO 13849-1. Rating of the overall safety channel is the responsibility of the system manufacturer.

INDUSTRY 4.0 SOLUTION

Nexen's Rail Brake Operating Mode Sensors for either Engagement or Disengagement are Industry 4.0 compatible and can provide information to maximize machine efficiency.

Having this information available aides with:

- Accurate Linear Positioning
- Predictive Maintenance
- Operational Feedback



Each of the two optional Proximity sensors can sense the following functions of the Rail Brake:

DISENGAGEMENT SENSOR DEFINITION

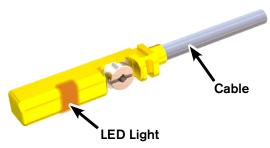
Sensor is activated when the rated air pressure is applied and the piston and facing pair move to a disengaged position.

ENGAGEMENT SENSOR DEFINITION

Sensor is activated when the pistons and facing pair move out of the disengaged position into a position in which the facings will transmit force to the rail.

OPERATING MODE SENSORS

The Operating Mode Sensor(s) can be used to signal Engagement or Disengagement of the brake on the rail. In an effort to give the system manufacturer the most versatility, the Operating Mode Sensors can be setup as Engagement or Disengagement and either redundant or individual states. The Safety Rail Brake comes equipped with either one or two sensor housings. The sensors, ordered separately, are available in both PNP and NPN modes.



Sensor Specifications

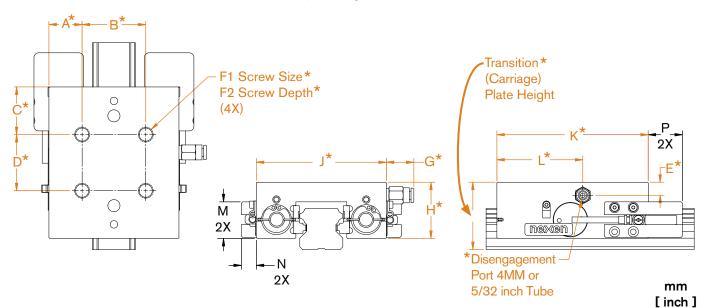
Sensor Type	Magneto-resistive		
Supply Voltage	10 to 30 VDC		
Operational Current	≤ 150 mA		
Switching Type	Normally Open		
Switching Type	PNP and NPN Available		
Ambient Temperature	-25 to +70°C [-13 to +158°F]		
Switching State Indicator	LED, Yellow		
Cable Length	7 meters [22.9 feet]		
Protection Class	IP68		
Protection	Short Circuit, Wire Breakage & Reverse Polarity Protection		

Available Sensors

Sensor Product Number	Туре
966195	PNP (Sourcing)
966190	NPN (Sinking)

Optional Sensors: Dimensions

*These Dimensions are the same as standard units, see Page 6



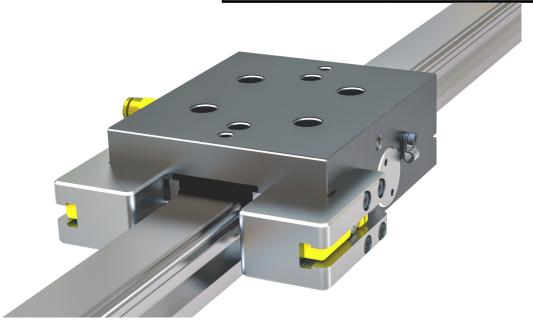
The following dimensions apply only to Nexen's optional sensor setup, which may be installed on Safety Rated Rail Brake units.

Additional dimensions and tolerances are available in the drawings and CAD models on the product pages on Nexen's website,

www.nexengroup.com

Contact Nexen if one or more of these dimensions must be modified for your application.

Model	М	N	Р		
RB15B	19.3	8.0	18.3		
	[.76]	[.31]	[.72]		
RB20B	19.3	8.0	18.3		
	[.76]	[.31]	[.72]		
RB25B	19.5	8.0	18.3		
	[.77]	[.31]	[.72]		
RB30B	28.0	8.0	18.5		
	[1.10]	[.31]	[.73]		
RB35B	28.0	8.0	18.5		
	[1.10]	[.31]	[.73]		
RB45B	33.0	8.0	18.5		
	[1.30]	[.31]	[.73]		
RBL55B	N/A, Not available with optional operating mode sensors.				
RBL65B	N/A, Not available with optional operating mode sensors.				

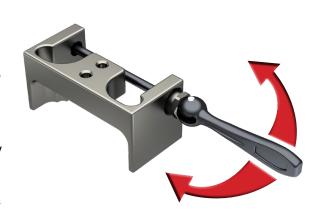


A New Standard In Performance

RBM: Manual Rail Brake

Nexen's RBM Series of linear profile guide rail brakes use a manually actuated lever to secure the load in holding applications. With no effect on bearing surfaces, the brake provides positive zero backlash holding in all axes. The compact footprint, compared to pneumatic and electric rail brakes, allows for ease of installation.

Nexen's RBM Series is engineered for dependable performance. The RBM Series provides an industry leading braking solution for linear profile guide rails. If personnel safety is required, an unrelated, redundant safety system is recommended. Nexen's RBM Series manual rail brakes are not safety rated.



- Easy operation. No wiring. No air lines.
- Zero backlash for accurate position holding
- Brake is compact for ease of installation
- Brakes engagement status is apparent via lever position
- Ideal for power-off and holding applications
- Large clearance between brake and rail compensates for installation misalignment
- Models available to fit most common profile guide rails
- Static holding cycle life in excess of one hundred thousand cycles

Manual Rail Brake: Product Description

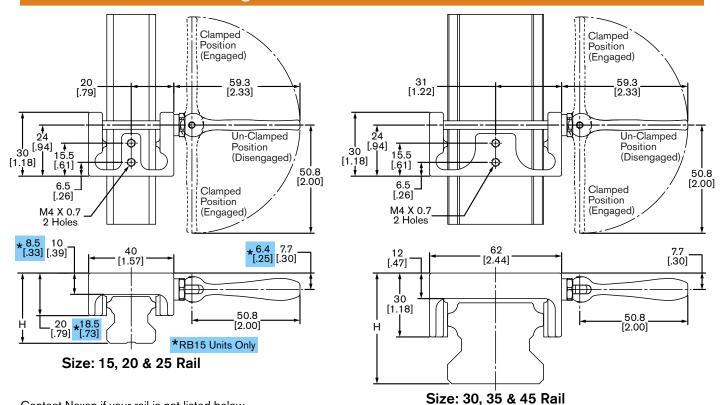
Example: RBM 25 - THK - HSR

Product Type Manual Rail Brake

Rail Manufacturer	Rail Model		
	HSR		
THK	SHS		
	SR		
IKO	LWH / MH		
	LWE / ME		
Nek	NH / LH		
INSK	NS / LS		
NSK	NH / LH		

^{*} Brake not compatible with Size 45 NSK-NS/LS Rail

Dimensions and Holding Force



Contact Nexen if your rail is not listed below.

Contact Nexert II your fail is not listed below.								
Rail Size	Rail Manufacturer THK	Rail Manufacturer IKO	Rail Manufacturer NSK	H (mm)	Weight (g)	Rated Static Holding Force (N)		
15	SHS, SR	-	NS / LS	22.5	79	400*		
	HSR	LWE / ME, LWH / MH	NH / LH	24				
20	SR	LWE / ME	NS / LS	26.5	88			
	SHS	-	-	27				
	HSR	LWH / MH	NH / LH	28.5				
25	SR	-	NS / LS	28.5	85			
	-	LWE / ME	-	30				
	SHS	-	-	31.5				
	HSR	LWH / MH	NH / LH	33				
30	SHS, SR	-	NS / LS	36	140			
	-	LWE / ME, LWH / MH	-	38				
	HSR	-	NH / LH	40				
35	SHS	-	-	40	138			
	HSR, SR	LWE / ME, LWH / MH	NS / LS, NH / LH	42				
45	SHS	-	-	46	135			
	-	LWE / ME, LWH / MH	-	48				
	SR	-	-	50				
	HSR	-	NH / LH	52				

^{*} Actual holding force may be reduced by approximately 50%, when rail or clamping surface of brake is not clean.

(Grease, excessive oil, excessive dust, debris or metallic wear powder.) Holding force may decrease on certain types of rails.

Brake must be adjusted once every six months, or once every 10,000

Installation Examples

Using a Flat Carriage Plate

M4

Screws

Flat Carriage Plate

Adapter Plate: See User Manual

Stepped

Carriage

Plate

CUTTING SYSTEMS

GANTRY SYSTEMS

MEDICAL PRODUCTS

ROBOTICS

AEROSPACE

MACHINE TOOL

SEMICONDUCTOR

MATERIAL HANDLING

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